Revisions to this Memorandum of Understanding will not be accepted.

Memorandum of Understanding between
The United States Environmental Protection Agency
and
Company Name

I. Common Agreements and Principles

A. This is a voluntary agreement between Company Name ("ENERGY STAR® Scanner Partner" or "Partner") and the United States Environmental Protection Agency (EPA), by which Company Name joins the ENERGY STAR Program. The terms of this Memorandum of Understanding (MOU) shall apply to scanners sold by Partner under its own brand name(s).

B. Partner and EPA agree that the primary purpose of the ENERGY STAR Program is to promote the manufacturing and marketing of energy-efficient equipment, thereby potentially reducing combustion-related air pollution.

C. Partner and EPA agree that the use of energy-efficient equipment may also increase profits and competitiveness.

D. Partner and EPA agree that the ENERGY STAR Program may also improve or enhance equipment's useful lifetime, customer satisfaction, and overall product quality.

E. Partner and EPA agree that publicizing the ENERGY STAR Program is important to demonstrate the following: the concern of Partner for the environment, the vitality of the free enterprise system in reducing costs, and the capability of partnership programs to achieve environmental goals.

F. Partner and EPA agree that maintaining public confidence in the ENERGY STAR Program is critical to achieving the shared goals of Partner and EPA.

G. Partner and EPA agree that membership in the ENERGY STAR Program is essential to the cooperative effort to achieve the shared goals stated above.

II. Definitions

A. Scanner: For purposes of this MOU, a scanner is defined as an electro-optical device for converting color or black-and-white information into electronic images that can be stored, edited, converted, or transmitted primarily in a personal computing environment. Scanners defined as

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ENERGY STAR is a U.S. registered mark.

such are typically used for digitizing hard-copy images. The intent of this MOU is to focus on widely-used desktop scanners (e.g., flatbed, sheet-fed, and film scanners); however, high-end office document management scanners that meet the specifications outlined below may qualify for the ENERGY STAR label. This MOU is for stand-alone scanners; it does not cover multifunction products with scanning capabilities, network scanners (i.e., scanners that connect exclusively to a network and are capable of managing the scanned information for transmissions to multiple locations on the network), or scanners that are not powered directly by the building power supply.

B. Base Unit: The base unit is defined as the most basic version of a scanner that is actually sold as a fully operational model. The base unit is typically designed and shipped in a single piece, and does not include any external power-consuming accessories that may be sold separately.

C. Scanner Model: For purposes of this MOU, a scanner model is defined as a base unit and one or more specific accessories that are advertised and sold to consumers under a single model number. When advertised and sold to consumers without any additional accessories, a base unit is also considered a scanner model.

D. Accessory: Any piece of additional equipment that is not necessary for the standard operation of the scanner, but that may be added in order to enhance or change scanner performance. An accessory may be sold separately under its own model number, or sold with a base unit as part of a scanner package or configuration. Examples of accessories include automatic document feeders (ADFs) and transparency adaptors.

E. Low-power Mode: For purposes of this MOU, the low-power mode is the lowest power state the scanner is designed to enter after some period of inactivity, without actually turning off. The scanner enters this mode within a specified period of time after the last image was scanned.

F. Default Time: The time period set by the Partner prior to shipping that determines when the scanner will enter the low-power mode. The low-power mode default time shall be measured from the time the last image was scanned.

III. Effective Date of MOU and Duration

A. This MOU shall be effective when signed by both EPA and Partner.

B. Both parties agree that Partner may begin to qualify scanner models pursuant to Section IV.B., below, beginning on April 1, 1997.

C. The terms of this MOU shall remain in force until such time as EPA institutes new specifications or discontinues the ENERGY STAR Scanner Program. Both parties agree that as

technologies and markets change, it may become desirable to change the technical specifications included in this MOU in order to keep the ENERGY STAR Scanner Program responsive and to maintain its integrity.

D. Both parties agree that this agreement can be terminated by Partner or EPA at any time, and for any reason, with no penalty. However, both parties agree that termination for noncompliance would only occur in accordance with the procedures of Section VI., below.

IV. ENERGY STAR Scanner Partner's Responsibilities

A. Partner agrees to appoint a responsible representative of the company as liaison with EPA for the ENERGY STAR Scanner Program and to notify EPA within one month of any change in liaison designation. (See Attachment A.)

B. Product Qualification for the ENERGY STAR Logo

Partner agrees to introduce one or more specific base units that meet the specifications outlined below.

Table 1. Criteria for the ENERGY STAR Scanner Program

Low-power Mode	Low-power Mode Default Time
≤ 12 watts	≤ 15 minutes

After shipping, Partner or customer may change the low-power default time or disable the low-power mode in order to accommodate a customer's usage patterns. The time setting shall not exceed a Partner set maximum of 60 minutes.

C. Testing

1. Partner agrees to perform tests, as necessary, to determine which base units comply with the specifications. Based on the results of these tests, Partner shall self-certify those scanner models that it determines are compliant with the specifications outlined above. Partner may submit information to EPA on compliant scanner models on a voluntary basis.

2. Power consumption shall be measured from the outlet or power supply source to the product under test. Partner shall measure the average power consumption of the base unit. See EPA

ENERGY STAR Scanner Testing Guidelines for more information.

D. Employee Education

Partner agrees to provide information about the ENERGY STAR Scanner Program to all of its employees whose jobs are relevant to the development, marketing, sales, and service of ENERGY STAR compliant scanner models.

E. Customer Education

1. Product Literature:

Partner shall provide general information to end users regarding the ENERGY STAR features of compliant scanner models. This information might include a description of the ENERGY STAR Scanner Program and a discussion of the energy savings associated with the product. Partner may determine the best manner through which to disseminate this general information to users. Examples of acceptable approaches include: special brochures provided with qualified scanner models, sales literature, user's manuals, point of purchase displays, information in specification sheets, savings comparisons, etc. Brochures and advertisements shall be worded to avoid misleading interpretations.

2. Logo Use:

To help consumers become familiar with the ENERGY STAR Scanner Program, the Partner shall consider placing the ENERGY STAR logo onto *all* qualified scanner models or their packaging. The logo may appear on the front/top of the scanner model, on the nameplate, or on the shipping box. The Partner shall also consider including the ENERGY STAR logo in brochures, manuals, and advertisements for qualified scanner models.

F. Proper Use of the ENERGY STAR Logo and Name

1. Partner understands that participation in the ENERGY STAR Scanner Program does not constitute EPA endorsement of Partner or its products.

2. It is the responsibility of the Partner to associate EPA, the ENERGY STAR logo, the ENERGY STAR name, and the ENERGY STAR Scanner Program only with those specific models that qualify under the terms and conditions of this MOU. See EPA's Logo Use Guidelines for more details and specific examples.

3. Partner understands that the ENERGY STAR name is a registered mark of the EPA. As such, Partner shall note this registered status, as appropriate. This may include (a) inserting the registered symbol, ®, next to the ENERGY STAR name (i.e., ENERGY STAR®) each time it appears

in a brochure, poster, advertisement, or other document *or* (b) providing the following statement with the first use of the ENERGY STAR name: "ENERGY STAR is a U.S. registered mark." See the Logo Use Guidelines for more details.

4. When the ENERGY STAR logo is used, Partner agrees that it shall be accompanied by the following statement: "As an ENERGY STAR Partner, Company Name has determined that this scanner meets the ENERGY STAR guidelines for energy efficiency." When the ENERGY STAR logo is applied directly to the product, Partner may place this statement in the user's manual.

5. Partner shall not utilize the logo in a manner that directly or otherwise implies EPA endorsement of the Partner or of Partner's products, other than with regard to a product's energy efficiency.

6. Partner agrees not to alter the ENERGY STAR logo.

7. If either EPA or Partner terminates this agreement, Partner will no longer be entitled to apply the ENERGY STAR logo to newly manufactured scanner products, and will no longer make reference to the ENERGY STAR Scanner Program so as to convey continuing involvement in the program.

G. Since this is a self-certifying program, Partner shall not include misleading statements in product literature that imply a product is approved or certified by the EPA, i.e., Partner shall not make claims such as "this scanner is EPA approved," or "this scanner is EPA certified."

H. If Partner tracks customer reactions to the ENERGY STAR features of ENERGY STAR compliant scanner models, then Partner agrees (assuming that no confidential or competitively valuable information is disclosed) to share this information with EPA in an effort to continually improve the ENERGY STAR Scanner Program and ensure its relevance in the marketplace. In turn, EPA agrees to share the information it collects (appropriately aggregated to preserve any confidential information) with all Partners.

V. EPA's Responsibilities

A. EPA agrees to designate a single liaison point for the ENERGY STAR Scanner Program (i.e., ENERGY STAR Program Manager), and to notify Partner within one month of any change in liaison designation. Please send signed MOU and other correspondence to this person. (See Attachment A.)

B. EPA agrees to accept test data as submitted by Partner, whether it is self-determined or determined by an independent third party. EPA will not officially approve any individual test reports voluntarily submitted by Partner.

C. While this is a self-certifying process, EPA reserves the right to conduct tests on scanner models bearing the ENERGY STAR logo from either the open market or other available sources, or voluntarily received from Partner.

D. EPA agrees to make an effort to encourage consumer acceptance of models introduced under this agreement and bearing the ENERGY STAR logo.

E. EPA agrees to provide Partner with recognition for its public service in protecting the environment by performing analyses about the pollution prevented by corporate participants, and providing this and other program information to appropriate news media sources for publication.

F. EPA agrees to promote energy-efficient equipment, and to inform consumers about the ENERGY STAR Scanner Program and ENERGY STAR logo by writing articles and/or cooperating with the news media by sharing information, where appropriate.

G. EPA agrees to work with Partner independently and/or in conjunction with other Partners to coordinate the placement of advertisements to promote energy-efficient equipment, educate consumers about the ENERGY STAR Scanner Program and logo, and provide Partner with due recognition for its public service in protecting the environment.

H. EPA agrees to loan Partner, at no charge, materials from which Partner can reproduce the ENERGY STAR logo.

VI. Conflict Resolution

A. Each party agrees to exercise good faith as a general principle for resolving conflicts arising under the ENERGY STAR Scanner Program.

B. Both parties agree to informally notify each other if any problems or issues arise under the ENERGY STAR Scanner Program and to work together to provide maximum public confidence in the program.

C. Procedure for Addressing Noncompliant Products

1. If EPA receives information that one or more scanner models certified by Partner as ENERGY STAR compliant may not meet all of the conditions of this MOU, then EPA will immediately notify Partner and attempt to address and resolve the problem informally.

2. If these informal discussions do not produce a mutually agreeable resolution, EPA shall notify Partner in writing that Partner shall be terminated from the ENERGY STAR Scanner Program unless it undertakes the specific corrective actions sought by EPA. Partner agrees to reply to EPA in writing within 20 business days of receiving EPA's letter. At that time, Partner shall

agree to do one of the following: (a) undertake in a timely and effective manner, the corrective actions sought by EPA; or (b) voluntarily terminate this agreement. If Partner does not respond to EPA's letter within 20 business days, or does not agree to either (a) or (b), then this agreement is terminated.

D. If Partner believes that EPA is not meeting all of its commitments, Partner agrees to formally notify EPA in writing. EPA agrees to respond in writing within 20 business days of receiving Partner's letter. At that time, EPA will do one of the following: (a) undertake the corrective actions sought by Partner, or (b) explain why such corrective actions cannot be undertaken.

VII. Freedom of Information Act and Confidential Business Information

Both parties understand that information provided by Partner to EPA will be treated in accordance with EPA's public information regulations under 40 Code of Federal Regulations, Part Two.

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Revisions to this Memorandum of Understanding will not be accepted.

The undersigned hereby execute this Memorandum of Understanding on behalf of their parties. The signer of this agreement affirms that he/she has the authority to commit Partner to participation in the ENERGY STAR Scanner Program.

For the U.S. Environmental Protection Agency (EPA):

Signature: _____ Date: _____

Name: Kathleen Hogan

Title: Director, Climate Protection Partnerships Division

For Company Name **:**

Signature: _____ Date: _____

Name: _____

Title: _____

ATTACHMENT A

Please complete and return with the signed Memorandum of Understanding.

EPA Contact:

Mailing Address:
Craig Hershberg
Manager, ENERGY STAR Office Equipment
US EPA
Ariel Rios Bldg.
1200 Pennsylvania Ave., NW
(Mail Code 6202 J)
Washington, DC 20460

Overnight Delivery Address:
Craig Hershberg
Manager, ENERGY STAR Office Equipment
US EPA
1310 L Street, NW
Washington, DC 20005
(202) 343-9120

Partner's Contacts:

Primary Contact (to receive all program administrative materials):

Name:
Title:
Address:
City, State, ZIP:
Telephone Number:
Fax Number:
E-mail Address:
Location of US Headquarters (if applicable):

Marketing/PR Contact (to receive marketing and communications materials):

Name:
Title:
Address:
City, State, ZIP:
Telephone Number:
Fax Number:
E-mail Address:

Customer Service Contact (to be given to the public for further information on products):

Telephone number:
Fax Number:
Web Site:

U.S. ENVIRONMENTAL PROTECTION AGENCY
ENERGY STAR® for Office Equipment (MC: 6202J)
Washington, DC 20460
(888) STAR-YES or (202) 775-6650 phone
(202) 565-2077 fax

TESTING CONDITIONS FOR ENERGY STAR® MEASUREMENT SCANNERS

Revised February 2000

In order to eliminate confusion and ensure consistency, the following protocol should be followed when measuring power under the ENERGY STAR® Scanners Program.

Outlined below are the ambient test conditions which should be established when performing the power measurement. These are necessary in order to ensure that outside factors do not affect the test results, and that test results can be reproduced later. A description of the specifications for testing equipment, as well as a discussion of testing issues, follow on the succeeding pages.

I. TEST CONDITIONS

Line Impedance:	< 0.25 ohm
Total Harmonic Distortion: (Voltage)	< 5%
Input AC Voltage:[1]	115 VAC RMS ± 5 V RMS
Input AC Frequency:[1]	60 Hz ± 3 Hz
Ambient Temperature:	25E C ± 3E C

[1] If products will be sold in Europe or Asia, testing should also be performed at the appropriate machine-rated voltage and frequency. For example, products destined for European markets might be tested at 230 V and 50 Hz. The logo should not be displayed on products shipped to Europe or Asia if the equipment does not meet the power requirements of the Program at the local voltage and frequency conditions.

II. TEST METHOD

Scanner Partners should measure and report the **average** energy consumption of their scanner products when in the low-power mode. Scanners should be tested in a configuration that is typical for their use and application to accurately record the low-power mode energy consumption.

To measure the average energy consumption, the scanner should be evaluated over a time period sufficiently long to include typical variations or surges in power (e.g., any cycling of the lamps). The recommended approach is to utilize a Watt-hour meter, and measure the energy consumption in the low-power mode of the scanner over one (1) hour. This will allow Partners to capture any variations in power usage that occur during the low-power mode. Dividing the measured energy consumption by the time period over which it is measured will produce average Watts. While this approach will provide the most accurate results, it is not essential to follow this for scanners whose idle-mode energy consumption does not vary. For scanners with constant idle-mode energy consumption, Partners may choose to utilize a high quality Watt-hour meter and take several measurements of instantaneous power.

III. TESTING EQUIPMENT

The goal is to accurately measure the TRUE power consumption[2] of the scanner. This necessitates the use of a **True RMS** Watt-Meter or Watt-Hour Meter. There are many watt-meters and watt-hour meters to choose from, but Partners will need to exercise care in selecting an appropriate model. The following factors should be considered when purchasing a meter and setting up the actual test.

Crest Factor

It is important to understand that electronic equipment, such as scanners, typically draws current in a waveform different from typical sinusoidal current.[3] Figure 1 shows the typical current waveform for an electronic product containing a switching power supply. While virtually any meter can measure a standard current waveform, it is more difficult to select a meter when irregular current waveforms are involved.

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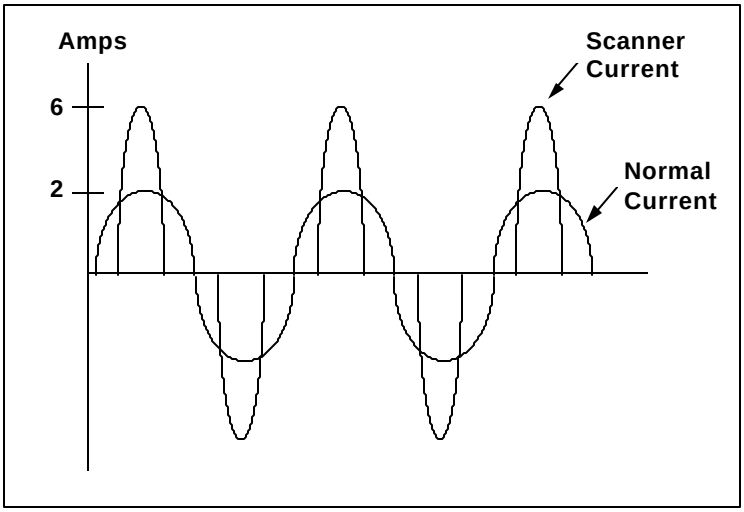
[2] True power is defined as (volts)x(amps)x(power factor), and is typically reported as Watts. Apparent Power is defined as (volts)x(amps) and is usually expressed in terms of VA or volt-amps. The power factor for equipment with switching power supplies is always less than 1.0; thus, true power is always less than apparent power.

[3] The crest factor for a sinusoidal 60 Hz current waveform is always 1.4. The crest factor for a current waveform associated with equipment containing a switching power supply will always be greater than 1.4 (though typically no higher than 8). The crest factor of a current waveform is defined as the ratio of the peak current (amps) to the RMS current (amps).

(Figure 1)



It is critical that the meter selected be capable of reading the current drawn by the scanner without causing internal peak distortion (i.e., clipping off the top of the current wave). This requires a review of the meter's crest factor,[4] and of the current ranges available on the meter. Better meters will have higher crest factors, and more choices of current ranges. When preparing the test, the first step should be to determine the peak current (amps) associated with the scanner being measured. This can be accomplished using an oscilloscope. A current range must be selected that will enable the meter to register the peak current. Specifically, the full scale value of the current range selected multiplied by the crest factor of the meter (for current) must be greater than the peak current reading from the oscilloscope. For example, if a meter has a crest factor of 4, and the current range is set on 3 amps, the meter can register current spikes of up to 12 amps. If measured peak current is only 6 amps, the meter would be satisfactory. However, if the current range is set too high in order to register peak current, then it may lose accuracy in measuring the non-peak current. Therefore, some delicate balancing is necessary. Again, with more current range choices and higher crest factors Partners will get better results.

[4] The crest factor of a Watt meter is often provided for both current and voltage. For current it is the ratio of the peak current to the RMS current in a specific current range. When only one crest factor is given, it is usually for current. An average True RMS Watt-meter has a crest factor in the range of 2:1 to 6:1.

Frequency Response

Another issue to consider when selecting a Watt-meter is the frequency response rating of the meter. Electronic equipment that contains switching power supplies causes harmonics (odd harmonics typically up to the 21st). These harmonics must be accounted for in power measurement, or the Wattage consumption will be inaccurate. Accordingly, EPA recommends that Partners use meters that have a frequency response of at least 3 kHz. This will account for harmonics up to the 50th, and is recommended by IEC 555.

Resolution

When testing scanners whose energy consumption is close to the ENERGY STAR® requirements, Partners will probably want a meter that can provide resolution of 0.1 W.

Accuracy

Another feature to consider is the resulting accuracy that can be achieved. Catalogues and specification sheets for Watt-meters typically provide information on the accuracy of power readings that can be achieved at different range settings. When measuring a product that is very close to the MOU specifications, Partners will need to set up a test that will provide greater accuracy. For example, if the resulting accuracy for a Watt-meter at the test settings is ± 0.5 W, then be sure the measured energy consumption of the scanner is within at least 0.5 W of the MOU specification.

Calibration

Meters should be calibrated every year to maintain their accuracy.

QUESTIONS AND ANSWERS REGARDING TESTING PROCEDURES FOR ENERGY STAR® Scanners

Q: Are these testing requirements mandatory?

A: Stringency in testing is to your own advantage. It can help protect you from being accused of cheating by one of your competitors. However, the stringency and accuracy of your own testing can be determined based on your specific product. For example, if your product does not contain a switching power supply, some of the issues discussed are not relevant, and a more straightforward testing protocol could be used. Also, if you know your product is well below the MOU specifications, then you do not need to be as accurate in your measurement. If your product is closer to the MOU specifications, however, it is better to follow these guidelines.

Q: Where can I find a True RMS Watt-hour meter that will meet my requirements?

A: A true RMS Watt-hour meter can be ordered from several manufacturers. Some manufacturers that carry watt-meters that may be appropriate include: Basic Measuring Instruments, Dranetz, RFL, and Valhalla. When you call any of these manufacturers be sure to tell them what you need the equipment for, and request their specification sheets. (As companies find adequate meters, please let us know so we can share them with other Partners.)

Q: Can I send my scanner to an outside laboratory for testing?

A: Yes. It is also possible to send your scanner to an outside testing lab for measurement. You can make the decision to buy your own equipment, or pay to have it tested depending on the number of models you plan to test. Be sure to tell any lab about your accuracy requirements. A good test lab will be aware of the issues surrounding the power measurement for electronic devices such as scanners, but don't assume this is the case. You will probably want to give them copies of the EPA ENERGY STAR® testing procedure and equipment requirements.

Q: Will the voltage coming out of the wall have a harmonic distortion <3%?

A: Not always. However, a "resonant" line voltage regulator will help to regulate distortion to within 3%.

Q: Can I assume the voltage coming out of my wall socket is close to 115 V?

A: No. The voltage coming out the wall could easily vary by more than +/- 5 V from the suggested 115 Volts AC. By applying a "resonant" line voltage regulator between the wall outlet and the device under test, the input voltage can be regulated to 115 V $^{+/-}$1%.

QUALIFIED PRODUCT INFORMATION FORM FOR SCANNERS

ENERGY STAR® product information form for use by ENERGY STAR qualified scanner partners
(Companies who have joined ENERGY STAR for scanners by signing the Memorandum of Understanding)

You may use this form to report only those products that are sold under your company's brand name. If your firm sells its models to another company that uses its own brand name, that company must join the program and report its own products. Information from this form will be added to the list of ENERGY STAR qualified scanner products. Please copy this form and fax one for each qualifying product model to ***ENERGY STAR, c/o ICF Consulting, (202) 862-1144 with ATTN: Erin Trager.***

Company Name:_____
(As listed in MOU)

Product Contact Information
(For public requesting product information)
Tel:_____ Fax:_____

E-mail: _____

Note: Please provide the following information on the configuration of the tested model ONLY.

Brand	Model	Type (e.g., Flatbed, Sheet-fed)	Watts in Sleep Mode	Date Product First Shipped
Example	*Generica*	*Flatbed*	*12*	*4/97*

Tested By: (Name of Firm or Self-Tested) _____

Please provide any other relevant information:

1. Applicable Characteristics:

Color (Y/N)	PC/Mac Compatible (PC, Mac, Both)	Optical Resolution	Max. Interpolated Resolution (if applicable)	Bit-Depth (Grayscale/Color)
Y	Both	400 x 800 dpi	1600 x 1600 dpi	8-bit/24-bit

2. Accessories/Other features (e.g., document feeder, transparency adapter, type of scanning software):

_____

3. If this model is listed with the US General Services Administration, please include its schedule number and special item number. _____

ENERGY STAR is a registered US mark.